



## SEQUENCE LISTING

## (1) GENERAL INFORMATION:

(i) APPLICANT: Chee, Mark S.  
Wang, Chunwei  
Jevons, Luis C.  
Bernhart, Derek H.  
Lipshutz, Robert J.

(ii) TITLE OF INVENTION: Computer-Aided Visualization and  
Analysis System for Sequence Evaluation

*a3*  
(iii) NUMBER OF SEQUENCES: 39

*Red 811*  
(iv) CORRESPONDENCE ADDRESS:

- (A) ADDRESSEE: Townsend and Townsend Khourie and Crew  
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(C) CITY: San Francisco  
(D) STATE: California  
(E) COUNTRY: USA  
(F) ZIP: 94105

(v) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk  
(B) COMPUTER: IBM PC compatible  
(C) OPERATING SYSTEM: PC-DOS/MS-DOS  
(D) SOFTWARE: PatentIn Release #1.0, Version #1.25

(vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: US 08/327,525  
(B) FILING DATE: October 21, 1994  
(C) CLASSIFICATION:

(viii) ATTORNEY/AGENT INFORMATION:

- (A) NAME: Norviel, Vernon A.  
(B) REGISTRATION NUMBER: 32,483  
(C) REFERENCE/DOCKET NUMBER: 16528X-82

(ix) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: 415-326-2400  
(B) TELEFAX: 415-326-2422

## (2) INFORMATION FOR SEQ ID NO:1:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 15 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

ATGTGGACAG TTGTA

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 15 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

ATGTGGATAG TTGTA

## (2) INFORMATION FOR SEQ ID NO:3:

## (i) SEQUENCE CHARACTERISTICS:

- a3  
H21
- (A) LENGTH: 15 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

ATGTGGAKAG TTGTA

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

AAAACTGAAA A

## (2) INFORMATION FOR SEQ ID NO:5:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

AAAACCGAAA A

## (2) INFORMATION FOR SEQ ID NO:6:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

AAACCCAATC CACATCA

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

AAACCCAGTC CACATCA



## (2) INFORMATION FOR SEQ ID NO:8:

## (i) SEQUENCE CHARACTERISTICS:

- 23  
24
- (A) LENGTH: 31 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

GGGGAAGCAG ATTTGGGTAC CACCCAAGTA T

## (2) INFORMATION FOR SEQ ID NO:9:

## (i) SEQUENCE CHARACTERISTICS:

- 3*  
*sub*  
*517*
- (A) LENGTH: 31 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

GGGGAAGCAG ATTTGAAMAC CACCCAAGTA T

## (2) INFORMATION FOR SEQ ID NO:10:

## (i) SEQUENCE CHARACTERISTICS:

- ak3  
AD17
- (A) LENGTH: 59 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

GCATTAGTAG AGATATGTAC AGAAATGGAA AAGGAAGGGA AAATTTCAAA AATTGGGCC

## (2) INFORMATION FOR SEQ ID NO:11:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
10  
17
- (A) LENGTH: 59 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

GCATTAGTAG AAATTTGTAC AGAGATGGAA AAGGAAGGGA AAATTTCAAA AATTGGGCC

## (2) INFORMATION FOR SEQ ID NO:12:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear


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(ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

GCATTAGTAG AGATATGGAG AGRARDGGRA AXXXAAGGGA AAATTNNNAA AATTGGGCC

## (2) INFORMATION FOR SEQ ID NO:13:

## (i) SEQUENCE CHARACTERISTICS:

- 
- (A) LENGTH: 59 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

GCATTAGTAG AGATATGKAS AGRARDGGRA AXXXAAGGGA AAAKTNNNAA AATTGGGCC

## (2) INFORMATION FOR SEQ ID NO:14:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

GCATTAGTAG AGATATGKAS AGRRRDGGRA AXXXAAGGGA AAADTYNNAA AATTGGGCC

## (2) INFORMATION FOR SEQ ID NO:15:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

GCATTAGTAG AGATATGTAS AGRRADGGAA AXGGAAGGGA AAATTNNNNA AATTGGGCC

59



## (2) INFORMATION FOR SEQ ID NO:16:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
216  
011
- (A) LENGTH: 59 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

GCATTAGTAG AGATATGTAC AGRGAGGGAA AXGGAAGGGA AAATTNNNNA AATTGGGCC

59

## (2) INFORMATION FOR SEQ ID NO:17:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
17
- (A) LENGTH: 59 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

GCATTAGTAG AGATATGTAS AGRGAGGGAA AXGGAAGGGA AAATTNNNNA AATTGGGCC

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

GCATTAGTAG GAGGNNNGAC AGGGRKGGAA AXXMAAGGGA AAAKTNNNAA AATTGGGCC

59

## (2) INFORMATION FOR SEQ ID NO:19:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

TCGAGATAAT CTATGTCCTC GTCTACTATG TCATAATCTT CTTTACTTAA ACGGTCCTTT	60
TACCTTTGGT TTTTACTATC CCCCTTAACC TCCAAAATAG TTTCATTCTG TCATGCTAGT	120
CTATGGACAT CTTTAGACAC CTGTATTTTCG ATATCCATGT	160

## (2) INFORMATION FOR SEQ ID NO:20:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

NNGAGATANN NTATGTCCTC CTCYACTATG TNANNNNNNN NNNNNNNNAA ACGGTCCTNN 60  
NNNNNNNNNN NNNNNNNNNN CINCNTAACC TCCAAAATAN NNNNNNTCTN NNNNANNNTT 120  
CTANNNGNAG NNNNAGANAR NCCNNNNNNN NNATNCATGT 160

## (2) INFORMATION FOR SEQ ID NO:21:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

TCGAGATAAT CTATGTCCTC GTCTACTATG TCATAATNNN NNNNACTTAA ACGGTCCTTT 60  
TACCTTTGGT TTTTACTATC CCCCTTAACC TCCAAAATAG TTTCATTCTG NCATANNAGT 120  
CTATGNGNNG NNNTAGACAG NCCNNNNTCG ATATCCATGT 160

## (2) INFORMATION FOR SEQ ID NO:22:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

TCGAGATAAT CTATGTCCTC GCTACTATG TCATAATCTT CTTTACTTAA ACGGTCCTTT 60  
TACCTTTGGT TTTTACTATC CNNCTTAACC TCCAAAATAG TTTCATTCTG TCATACTAGT 120  
CTATGGGTAG CTTTAGACCN CCGTATTTTCG ATATCCATGT 160

## (2) INFORMATION FOR SEQ ID NO:23:

## (i) SEQUENCE CHARACTERISTICS:

- a3*  
*0.517*
- (A) LENGTH: 160 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

TCGAGATAAT CTATGTCCTC GTCTACTATG TCATAATCTT CTTTACTTAA ACGGTCCTTT	60
TACCTTTGGT TTTTACTATC CCNCTTAACC TCCAAAATAG TTTCATTCTG TCATACTAGT	120
CTATGGGTAG CTTTAGACCC CCGTATTTTCG ATATCCATGT	160



## (2) INFORMATION FOR SEQ ID NO:24:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

NCGGGATANT NTATGTCCTC GTCYACTATG TCANNNNNCN NNCNNNNCAA ACGGTCCNCC 60  
NNNNNCNNNN NNCNNCYANG AANCYCAACC TCCAAAATAN NNNNNNTCTN NNNNANNNCN 120  
CTNNNNNNAG NGNNAGACAC CTGTATNNNN NTATNCAYGT 160

## (2) INFORMATION FOR SEQ ID NO:25:

## (i) SEQUENCE CHARACTERISTICS:

- a3  
ab  
517
- (A) LENGTH: 160 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

TCGRGATAAT CTATGTCCTC GTCTACTATG TCATAATCCN NNCNNCTCAA ACGGTCCTYC	60
CNNNNYTGGT TNYTACTATC CCCCTTAACC TCCAAAATAG TTTCATTCTG NCATACNNST	120
CTANNNNNAG NGTTAGACAC CTGTATTTCG ATATCCATGT	160

## (2) INFORMATION FOR SEQ ID NO:26:

## (i) SEQUENCE CHARACTERISTICS:

- Q3  
A3  
(A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

TCGAGATAAT CTATGTCCTG GTCTACTATG TCATAATCCN NCCTACTCAA ACGGTCCTTC 60  
TACCTTTGGT TTTTACTATC CMCCTTAACC TCCAAAATAG TTTCATTCTG TCATACTAGT 120  
CTATGAGTAG CTTTAGACAC CTGTATTTTCG ATATCCATGT 160

## (2) INFORMATION FOR SEQ ID NO:27:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 160 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

TCGAGATAAT CTATGTCCTC GTCTACTATG TCATAATCTT CTTTACYCAA ACGGTCCTXC 60  
TACCTTTGGT TTTTACTATC CCMCTTAACC TCCAAAATAG TTTCATTCTG TCATACTAGT 120  
CTATGAGTAG CTTTAGACAC CTGTATTTCG ATATCCATGT 160

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

AAACCCAATC CACATCM

## (2) INFORMATION FOR SEQ ID NO:29:

## (i) SEQUENCE CHARACTERISTICS:

- 3*  
*20*  
*5117*
- (A) LENGTH: 17 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

MMACNCANNC CACANNM

## (2) INFORMATION FOR SEQ ID NO:30:

## (i) SEQUENCE CHARACTERISTICS:

- AD 3  
AD 117
- (A) LENGTH: 11 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

TTGGGTACCA C

## (2) INFORMATION FOR SEQ ID NO:31:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
sub  
011
- (A) LENGTH: 11 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

TTGAAMACCA C



## (2) INFORMATION FOR SEQ ID NO:32:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

ACAGAAATGG A

## (2) INFORMATION FOR SEQ ID NO:33:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
ab  
D11
- (A) LENGTH: 11 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

AGAGRATDGG R

(2) INFORMATION FOR SEQ ID NO:34:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

ASAGRRADGG A

## (2) INFORMATION FOR SEQ ID NO:35:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

ACAGGRRGG A

## (2) INFORMATION FOR SEQ ID NO:36:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

CTGGGGGGTA T

## (2) INFORMATION FOR SEQ ID NO:37:

## (i) SEQUENCE CHARACTERISTICS:

- Q3  
8/11
- (A) LENGTH: 11 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

CTGGCCSGTG T

## (2) INFORMATION FOR SEQ ID NO:38:

## (i) SEQUENCE CHARACTERISTICS:

- 3  
17  
3
- (A) LENGTH: 11 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

CTGGGCGGTA T

## (2) INFORMATION FOR SEQ ID NO:39:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: DNA (oligonucleotide)

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

CTGGCACGTG T